

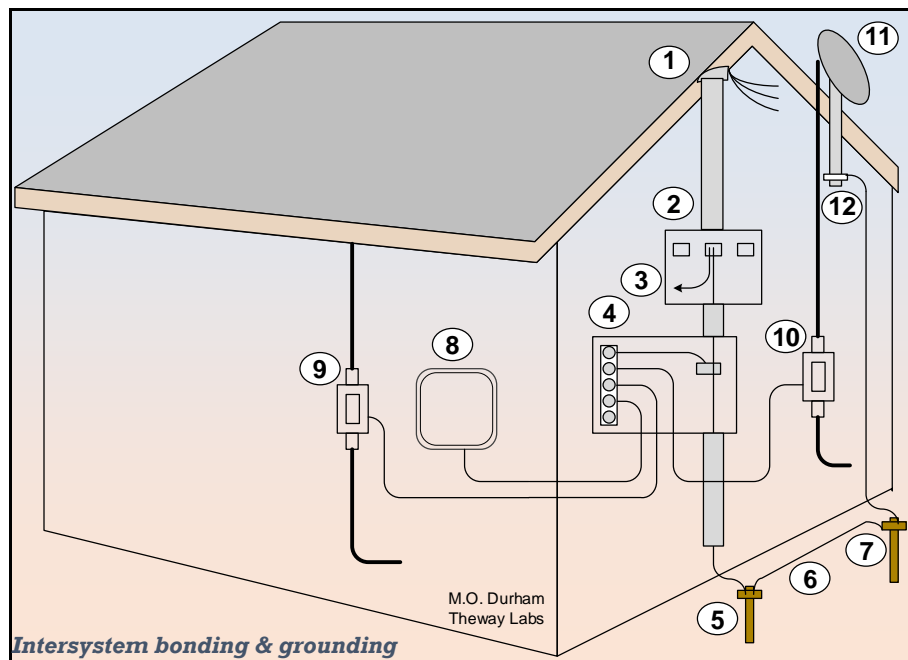
Ham 40 – Grounding Intersystem NEC

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⚠ WARNING

Grounding is one of the most critical safety issues associated with amateur radio. Proper grounding is necessary for safety while improper grounding and bonding invites disaster. This is not a design document, since every installation is unique. Follow all codes, standards, and FCC requirements. ARRL has a definitive book on grounding.

1. *Earth* is connection to the soil. *Grounding* is providing a path to earth. *Bonding* is connecting metallic conductors together to have the same potential.
2. *Grounding electrode* is the metal placed in the earth, either a ground rod, copper, or rebar. *Grounding electrode conductor* is the wire, usually bare or green insulated, running to the electrode. *Grounded* is a current carrying circuit wire intentionally connected to ground. On AC, the *neutral* conductor insulation is white, on DC the negative conductor is black.
3. The *National Electrical Code (NEC, NFPA 78)*, adopted by all states, is the minimum Code for grounding systems on residences and other structures. *Chapter 8, Communications Systems* is proscriptive for antenna, coax, and broadband. *Article 250* defines the ground arrangements.
4. The illustration is various intersystem bonding and ground related apparatus. The table is the *NEC Article*.



5. The table is for identification only. Refer to the NEC for design and application.

#	Device	NEC	Conductor	Max
1	Feeder with utility ground	NESC		
2	Meter-connect utility gnd to gnding electrode conductor	250		
3	Service panel - neutral connect to ground	250 - II		
4	Intersystem bonding point for all grounds (single point)	250.94		
5	Grounding electrode conductor	250.66	>#6	
6	Grounding electrode – bond all electrodes	250 - III	>#6	
7	Grounding electrode within 20 ft of antenna	810		<20'
8	Communications (phone, powered) with discharge	800, 805	>#14 - <#6	<20'
8	Network powered broadband interface with discharge	830, 725	>#14 - <#6	
9	Coax / CATV discharge / block unit	820	>#14 - <#6	<20'
10	Antenna discharge unit (satellite, ham)	810	>#10	
11	Coax / antenna	820	>#14 - <#6	<20'
12	Antenna mast ground	810		<20'
11	Outdoor antenna conductor (long wire)	810.16 & 52		

- Grounding of outer conductor is as close as practical to building entrance.
- If distance is too great, add electrode and bond to other electrodes.
- For greater than 20', the inductive reactance is so large that the wire is less effective.

6. *Standard for the Installation of Lightning Protection Systems (NFPA 780)* provides the minimum guidance for lightning protection, including antennas which are exposed to lightning. Keep >6' from other conductors.

7. Life is good. Enjoy.

